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UNITED STATES DISTRICT COURT
SOUTHERN DISTRICT OF NEW YORK

ORIGINAL

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GENERAL PUBLIC UTILITIES CORPORATION, :
JERSEY CENTRAL POWER & LIGHT COMPANY,
METROPOLITAN EDISON COMPANY and :
PENNSYLVANIA ELECTRIC COMPANY,
:
Plaintiffs,
: 80 Civil 1683
-against- (R.O.)
:
THE BABCOCK & WILCOX COMPANY and
J. RAY McDERMOTT & CO., INC., :
:
Defendants. :

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Continued deposition of the Babcock & Wilcox Company, by BERT MERRIT DUNN, taken by plaintiffs pursuant to adjournment, at the offices of Kaye, Scholer, Fierman, Hays & Handler, Esqs., 425 Park Avenue, New York, New York, on Friday, March 20, 1981, at 9:47 o'clock in the forenoon, before Charles Shapiro, a Certified Shorthand Reporter and Notary Public within and for the State of New York.



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* * *

B E R T M E R R I T D U N N, having been previously duly sworn, resumed and testified further as follows:

EXAMINATION (continued)

BY MR. SELTZER:

Q Mr. Dunn, you know that your testimony today is again under oath, do you not?

A Yes.

Q Could you or your counsel find a copy of what we have marked as GPU Exhibit 96.

Approximately how long were you at the 11 a.m. meeting on March 28, 1979? I know you said you came in a little late.

A I am not sure. I think it was about a half hour.

Q Was all of the attention at the meeting for the half hour you were there devoted to the Three Mile Island incident which was then taking place?

A I believe so.

Q Who was doing most of the talking?

A Allen.

Q And that is Allen Womack?

A Yes.

Q Was it he who was relating or relaying what information was available from Three Mile Island to the others in the room?

A That is my understanding.

Q If there was a two-phase condition in the primary system, that would mean that the primary system had hit the saturation point; right?

A Yes.

Q Bob Jones's notes indicate on the second page of GPU Exhibit 96 marked for identification "Possible two-phase primary."

Do you see that notation?

A Yes.

Q Do you recall learning at any time at or during the morning of March 26, 1979 that there was a possibility of two-phase conditions existing in the primary system at Three Mile Island?

A I don't recall.

Q Do you recall receiving any information which indicated that there might be saturation in the primary system? I am talking about during the morning of March 28th.

A No, I do not recall.

Q Do you see the indication in Bob Jones's notes to solid pressurizer?

A Yes. I believe PRZ would stand for pressurizer.

Q And PZR?

A And PZR.

Q Do you recall Allan Womack or anybody else at the morning meeting relaying information to the effect that the pressurizer at Three Mile Island was solid or had been solid?

A At this time, I do not recall.

Q Since the Three Mile Island accident, have you ever reviewed with Bob Jones his notes which are GPU Exhibit 96?

A Other than perhaps immediately after the meeting, no, I don't believe so.

Q Do you believe that immediately after the meeting you discussed the meeting with Jones?

A I don't know one way or the other.

Q Is Jones somebody that you do a lot of work with?

A Yes.

Q Is he your right-hand man in the ECCS Unit?

A Yes.

Q Do you write evaluations of the performance of the people in your unit on a periodic basis?

A I either write or review evaluations of the performance of the people in the unit on a yearly basis.

Q I missed something. You either --

A Write or review.

Q When you don't write but you review, in what form do you review, or is the review sometimes written also?

A No, the review is not written unless there is a complaint about the evaluation. Then the review might be written.

Q To whom is the review given?

A Generally the structure is that performance evaluation is performed by the immediate supervisor, so I would evaluate the people reporting directly to me. My supervisors evaluate the people reporting to them.

In order to insure a continuity

amongst the supervisors of performance evaluation, I review each of the supervisor's evaluations to make sure that what evaluations are given to a person by one supervisor are not overly strict or stringent relative to what another supervisor may be doing, or vice versa.

Q For how many years has Bob Jones reported to you?

A In one position or another, approximately eight, maybe nine, since he came with the company.

Q How have you rated his ability generally over the years?

MR. FISKE: Mr. Seltzer, I think if you are getting into performance evaluations, I think we are getting into an area that at least we ought to have some discussion about before we let Mr. Dunn answer these questions.

MR. SELTZER: Where and when would you like to discuss it?

MR. FISKE: Well, it just seems to me that my understanding at least is that there is a legitimate reason not to allow inquiry into personal evaluations and I am

not prepared to cite you a line of cases at this moment, but -- because this is the first time this came up, but it seems to me my position is not so unreasonable.

MR. SELTZER: Let me allay your concerns if I can. I am not interested in Burt Dunn's sexual proclivities or sexual preferences, I am not interested in anything that is not closely related to his performance of work in the ECCS analysis unit, and particularly his ability to function on matters of importance in this litigation; that is all.

MR. FISKE: I understand and I would assume that your inquiry would be related to his job performance.

MR. SELTZER: Right.

MR. FISKE: Rather than other things.

MR. SELTZER: I also won't tell Jones what Mr. Dunn tells me.

MR. FISKE: Well, I am sure we would all appreciate that, but I am not sure that totally solves the problem.

I think what I would like to do with

this one is at least defer it. I am not saying that I eventually won't let him answer, but I think before we open up this whole area which obviously has broad implications beyond this one question, it seems to me that everyone is justified in giving this some more thought.

MR. SELTZER: I disagree with what you are saying and I will not defend your right to say it either.

I don't think that these pauses for thought about the kinds of instructions you give are really appropriate. I think -- well, let me ask some questions that are less global than the one I asked, and if you feel you have to make an objection, obviously you will make it.

MR. FISKE: Yes. I will make it clear that I am not necessarily making this as a permanent instruction, but I think that this is an area where at least before I allow Mr. Dunn to answer these questions and open this up, it is something that I would like to consider and it has just come

up at this point and that is the reason for my position. And I do think it has implications beyond Mr. Dunn and Mr. Jones.

MR. SELTZER: Bob, I can empathize with what you are going through, but I am sure that it has occurred to you that you may want to ask Gary Miller, how did he rate the performance of the control room operators prior to the Three Mile Island accident, and it would not have occurred to me, and it still doesn't occur to me, that it would be rational to block examination of Gary Miller, the Manager of Three Mile Island Station, on his reports on the competency of the control room operators who were in the control room the day of the Three Mile Island accident. I just -- I would be surprised if you or your partners or associates who were doing an examination of our people don't get into those areas of examination, and I frankly am a little surprised that you are even thinking you need to contemplate further my examining your witness on this same

subject.

MR. FISKE: Well, I am not talking about contemplating this any longer than perhaps the rest of the morning. So if we decide to let this go forward, we will certainly let it go forward today.

MR. SELTZER: Do you want to take the witness outside and tell him what he can and can't say?

MR. FISKE: No, that is not the point. It has nothing to do with talking to Mr. Dunn. It is just a question of policy as to whether we do or do not want to take the position that would make personal ratings a relevant line of inquiry in this litigation. That is the simple issue which involves, among other things, a better understanding of the law than I have, just sitting here at this moment, as to what right we would have to object if we did object, but before I just say "go ahead and ask him," I would at least like to be sure that I am on firmer ground.

I may decide I have no foundation for

this objection at all, in which case I will tell you.

MR. SELTZER: O.K. Bob, I will accept your offer then to let us know by the end of the morning what your position is on this.

MR. FISKE: All right.

MR. SELTZER: I would like to mark for identification as GPU Exhibit 97 Mr. Dunn's polygraphic notes entitled "Notes on Wednesday & Thursday day of event."

(Handwritten notes of Mr. Dunn, three pages, was marked GPU Exhibit 97 for identification, as of this date.)

Q Is GPU Exhibit 97 a copy of handwritten notes which you created sometime shortly after March 28, 1979?

A It appears to be.

Q What was your purpose in creating these notes?

A At the time I felt it might be useful for future purposes to have some small amount of record of the events the first few days of the Three Mile Island accident and jotted down

some short notes for that purpose.

Q Did you send these notes to anyone?

A I don't know.

Q You referred yesterday and you also refer in point 5 of GPU Exhibit 97 to someplace called the war room.

Is that your designation or have others at B&W called it the war room?

A Yesterday I referred to a room in the project management area of the building.

Others within the company use the title "war room" for that room.

MR. FISKE: Can I hear that answer, please.

(The reporter read the record.)

MR. FISKE: Excuse me one second.

Q Do you want to add to or change your answer in any way?

A The term "war room" came about in 1975 or 1976 in that it was created by the head of project management as a project control center, with some use in marketing, or at least it was our understanding in Engineering it would have some use in marketing our products and staying

on top of the market, and to the distaste, I think, of the project manager of project management, the engineers in the building started fondly referring to it as his war room or command center.

Q In the war room were there devices or equipment hooked up or available on March 28, 1979 for recording conversations in the room?

A As I recall, there were small tape recorders of a dictaphone nature in place and the telephone was connected to a loud speaker.

As to how much those devices recorded or how extensive their use was, I don't know.

Q Do you know whether any recording was being done during the afternoon meeting on March 28th, 1979 in the war room?

A No. I know the devices were present.

Q Have you ever seen or do you believe that there exists any notes of the March 28th morning meeting, other than Bob Jones's notes?

A I have not seen other notes and I have no basis for believing whether or not such notes exist.

Q Did you take any notes at the morning

meeting?

A No.

Q Were there any recording devices present at the 11 a.m. meeting in Allen Womack's office?

A Not that I recall.

Q Would you turn to the second page of GPU Exhibit 97, please.

I am sorry. Since that begins in the middle of a sentence, could you read what you have written in your handwriting beginning six lines from the bottom of page 1 where it says "About 10 to 30 seconds..."

A "About 10 to 30 seconds after this Lou Cartin and I looked at each other and said super heat. We immediately told management that we were loosing and at one time had probably uncovered the core. We asked for a charge rate of around 400 gpm. And started explaining to management how an uncovered core was consistent with full pressurizer level."

Q Could you go on, please.

A "(Kosiba) and many others about one-half hour later (enough time to seriously damage

an undamaged core. Management decided to try and tell TMI."

Q Thank you.

Is it correct that the "we" at the bottom of page 1 when you say "we asked for a charge rate" refers to you and Lou Cartin?

A That was the reference intended in writing these notes.

Q When you refer to a charge rate of 400 gpm, is that a requested rate of flow of 400 gallons per minutes from the high pressure injection system?

A Yes.

Q When you refer to a half-hour later, does that reference mean that approximately half an hour later management decided to try and tell people at Three Mile Island that it was the recommendation of Babcock & Wilcox that high pressure injection be on at a flow rate around 400 gallons per minute?

A Yes.

Q In other words, about half an hour after you and Lou Cartin had asked for that high pressure injection flow rate; is that the

meaning of this?

A Approximately.

Q You say that when you and Lou Cartin asked for a high pressure injection flow of around 400 gallons per minute, you "started explaining to management how an uncovered core was consistent with full pressurizer level."

Were there people in the room who initially didn't understand or at least did not appear to you to understand how "an uncovered core was consistent with full pressurizer level"?

MR. FISKE: Well, Mr. Seltzer, I think you ought to ask him about the conversation, who said what.

MR. SELTZER: He has already said that it took half an hour to 40 minutes to convince people that there was possible super heat going on. He says here that they started explaining how an uncovered core was consistent with full pressurizer level.

Q My question, Mr. Dunn, is: Are there people who appeared initially not to understand how an uncovered core was consistent

with full pressurizer level?

MR. FISKE: I will object to that.

MR. SELTZER: O.K.

Q You may answer.

THE WITNESS: May I answer?

MR. FISKE: Yes.

I am going to object to the form of the question. I think it is -- but go ahead, if you can, answer it.

I think it is improper evidence, but I will allow it for discovery.

MR. SELTZER: Thank you. I appreciate that very much.

A I don't think today I can say whether there were people that appeared not to understand about the relationship of core uncovery and the possibility of a full pressurizer level, or whether there were people that appeared not to understand the meaning of super heat within the upper regions of the system and what that meant relative to the amount of water that was available to cool the core.

I can say that we spent approximately a half-hour explaining these relationships and

what must have been an approximation, happening in the system at that time, to people, and that Dick Kosiba was the first person that I remember understanding what I was saying.

Q And you do recall testifying to the Rogovin Commission that it took you half an hour to 40 minutes to convince the others in the room that there was possible core uncovery?

MR. FISKE: Where did he say that?

Q Do you recall, referring to your testimony at page 79, that it took you approximately 40 minutes to convince others in the room that the Three Mile Island plant was in trouble?

A I recall talking about this area in both the Kemeny Commission and the Rogovin Commission depositions.

Q At the time you gave the testimony that you gave to those commissions, did you believe that you were telling the truth?

A Yes.

Q And were you testifying to the best of your recollection to both of those commissions?

A Yes.

Q What, as best you recall, did you say to the management who were in the war room to explain how an uncovered core was consistent with full pressurizer level?

A Well, I don't remember exactly what I said.

Q In words or substance.

A I was using words and illustrating with my hands how the levels of the fluid in the reactor coolant system proper and in the pressurizer could work as a function of the overall hydrodynamics of a postulated event --

Q Overall hydrodynamics?

A Hydraulics.

Lou Cartin at one time drew a picture on the blackboard of the system in cutaway and was doing essentially the same thing I was doing in words, putting postulated positions on the blackboard for water and illustrating how these positions could be consistent with the configuration of the plant.

Q In the course of the explanations that you and Lou Cartin were giving, were you describing to the people in the room how voiding

or steam formation in the primary system could push water into the pressurizer?

A I don't recall one way or the other talking about how the situation could happen.

I do recall illustrating how it could be at least stable at a given time, how it was consistent with the configuration that these kind of situations could develop.

Q For there to be an uncovered core and a full pressurizer, there would have to be voiding in the primary system; right?

A Yes.

Q And at some point there would have to be saturated conditions in the primary system; right?

A Yes.

Q In fact there would be saturated conditions until all of the water had been boiled off into steam; right?

A Not necessarily.

Q Would that generally be so in the reactor vessel?

A There would be saturated conditions somewhere within the system.

Q Would there be saturated conditions in the reactor vessel until all of the water in the vessel was boiled off?

A There would be saturated conditions -- there would have to be saturated conditions somewhere in the reactor vessel.

Q During the 30 to 40 minutes that you and Lou Cartin were explaining matters to management, were you and Lou getting any questions from people in the room?

A Yes.

Q Who was asking the questions, as best you can recall?

A Well, you said any questions.

I was observing secondhand what Lou was doing, so I should have responded with at least I got questions. I got a question from Dick Kosiba. I don't remember the question; I remember giving the answer.

Q What was the answer?

A The positioning of the water within the primary system and how these conditions made sense.

Q Did anybody else ask you a question

or make a comment on what you were saying during that half hour to 30 minutes?

A At this time I can't recall one way or the other.

Q Do you recall anybody in the room making --

A Excuse me.

Q Go ahead.

A Allen did ask me a question.

Q What did Allen Womack ask you?

A In substance, to double-check and assure myself that 400 gpm was the right number.

Q If you turn on the high pressure injection pumps full bore at Three Mile Island, they generate a thousand gpm; right?

A It depends on the system pressure.

Q At the pressure that you were hearing about in the afternoon, what did you believe they would be able to put out?

A At this time I don't recall what pressure we were given.

Q Parks had told you after lunch that they were at 2,000 pounds.

Do you know what flow the high

pressure injection pumps could generate against 2,000 pounds back pressure?

A No. I would have to go to plant data to find out.

Q When you and Lou asked for a charge rate from high pressure injection of around 400 gallons per minute, whey didn't you recommend just opening up the high pressure injection full throttle?

A I don't recall why we didn't recommend opening it up full throttle. We did feel that 400 was adequate to assure core coverage.

Q You didn't know what the level was of the water in the primary system or what the quantity of water was in the primary system at the time you were making this recommendation, did you?

A At that time I believed that the level was then above the core.

Q But you had taken half an hour to convince others in the room that there was super heat and the plant was in serious trouble and you yourself wrote that there was enough time to seriously damage an undamaged core.

Did you consider changing your recommendation during that half hour to open the high pressure injection full bore instead of just to around 400 gpm?

A No.

Q With a core that had been given enough time to become seriously damaged, would there be any reason for not recommending turning the high pressure injection on full throttle?

MR. FISKE: I will object to the form of that question. Mr. Seltzer, I don't have any objection if you put the question in terms of the time period.

MR. SELTZER: All right.

Q At the time the recommendation was being made on March 28, 1979 with the telephone call to Three Mile Island, in other words, after the half hour which was enough time for the core to become seriously damaged, was there any reason for not recommending that they turn on high pressure injection full throttle?

MR. FISKE: I object to the form of the question.

Q You may answer.

A At the time we were trying to have this be our recommendation, I did not have any objection to higher flows.

Q You said that you and Cartin did not change your recommendation from 400 gallons per minute to anything greater before the phone call was made.

Is there any information that you had at the time the phone call was made that made 400 gallons per minute be a better charging rate than full throttle?

A Not that I can recall.

Q You said you didn't have any objection to a recommendation for putting high pressure injection at full throttle.

Did anybody else in the room voice any objection to recommending that Three Mile Island have its high pressure injection pumps on full throttle at that time?

A Not that I recall.

Q At the bottom of page 83 of your Rogovin Commission testimony and the top of page 84, you were asked at the top of 84 to place a time on the perceptions and conversations

that you had had. On the previous page, at line 4, you were asked: "Now, this was around somewhere between, say, three and four o'clock in the afternoon?

"Answer: Yes, right."

Now, turning back to page 83, you said: "At that point in time I envisioned a water level somewhere around the middle of the core decreasing."

Do you see that?

MR. FISKE: May I make a suggestion, Mr. Seltzer?

MR. SELTZER: Sure, absolutely.

MR. FISKE: Can we just take a minute and permit Mr. Dunn to read all of these pages concerning the incidents at this meeting, from the beginning to the end, so that he has the whole thing in perspective? I don't want to be critical of you for picking out one question here or there.

MR. SELTZER: I am not taking it as criticism at all.

MR. FISKE: I think it would be useful.

MR. SELTZER: I assumed that you and he had gone over this sentence by sentence several times already.

MR. FISKE: Well, it is certainly true that Mr. Dunn has read this over prior to appearing here for this deposition, but now --

MR. SELTZER: Please do. I am just being cute.

MR. FISKE: Now that you are zeroing in on specific sentences, I think he should be permitted to review this.

(Pause.)

THE WITNESS: O.K.

MR. FISKE: O.K. Mr. Dunn has completed his reading assignment.

Q Would you take a look at page 81, please.

"During the afternoon meeting, you testified that it was your perception that the high pressure injection system at Three Mile Island was throttled back considerably."

And your answer at line 7 was, "Yes."

Were you asked that question and did

you give that answer?

A I have no reason to doubt that I did.

Q You were asked, "When did you become aware of that?"

And you said, "At about the same time."

"Question: So that was part of that same phone call at about three to 3:30?

"Answer: Yes."

Were you asked those questions and did you give those answers?

A I have no reason to doubt that I did.

Q You then went on to say, at line 12, "I did a quick Hewlett-Packard calculation."

I take it that is a free advertisement for the pocket calculator that you were using at the time.

A It seems reasonable.

Q You go on to say that you "requested that they advance the charging rate to 400 gallons per minute."

"Question: So at that time you recommended increasing the charging rate to 400 gallons per minute?

"Answer: Yes."

Does that mean that the charging rate which was passed on or requested of the people at Three Mile Island in the telephone conversation with them at about three to 3:30 was 400 gallons per minute, to the best of your recollection or as you see what you testified to somewhat earlier?

A Excuse me, I think I presupposed a question. I would like to have it read back.

Q I will ask it again.

At the time of the phone conversation with the Island about three to 3:30, is it correct that you have previously testified in the pages that you have in front of you that Three Mile Island increased the charging rate on high pressure injection to 400 gallons per minute?

A Is it correct that I previously testified that Three Mile Island --

Q I am just asking you --

MR. FISKE: They recommended it.

MR. SELTZER: That's right. He has used "requested" in line 13, and "recommended" is in the question on line 14.

MR. FISKE: Yes.

Q Was it your testimony earlier in response to questions by the Rogovin Commission attorneys that you recommended over the telephone that the rate of flow from the high pressure injection be increased to 400 gallons per minute?

A No.

Q Was somebody else relaying your recommendation over the telephone?

A I made the recommendation to the room. It was my understanding that that was eventually relayed over the phone.

Q Turning to page 83, do you see in the last paragraph at the bottom of the page where you say" "I mean now that is where I was at. At that point in time I envisioned a water level somewhere around the middle of the core decreasing."

Do you see that?

A Yes.

Q Do you see on the next page, line 4, where you were asked: "Now this was around somewhere between, say, three and four o'clock in the afternoon?

"Answer: Yes, right."

Was that your testimony before the Rogovin Commission?

A I have no reason to doubt that that was my testimony before the Rogovin Commission.

Q Is it correct that at the time that you envisioned the water level in the Three Mile Island plant at around the middle of the core and decreasing, your recommendation was being relayed to the Island to adjust the flow on the high pressure injection to 400 gallons per minute?

A Today I don't recall why I testified in this fashion, and as to whether the timing was at the same time or close, I don't believe I can distinguish.

Q At the time you were explaining to management how an uncovered core was consistent with a full pressurizer level, it is a fact, is it not, that you believed that the Three Mile Island core could be partially uncovered at the time you were speaking; isn't that right?

A Could be uncovering or the water level could be decreasing to where it might start uncovering.

Q At the time that you were talking, you didn't know whether the core was approaching uncovery or partially uncovered already, did you?

A We were under the impression at the time we received the information -- I believe we were under the impression at the time we received the information on the super heat that the core was covered.

Q What information gave you that impression?

A As I recall, we were told that the plant was letting water down, which means releasing water from the reactor coolant system -- I can't recall the term for the piping, but it is the piping normally used in the makeup mode to exchange water within the RCS, and I interpreted that to mean that they had to have water at that time in the nozzle belt vicinity of the reactor vessel.

Q When you said on page 2 of your GPU Exhibit 97 memo that the half-hour conversation or explanation was "enough time to seriously damage an undamaged core," did you mean that the half hour was enough time to partially uncover

the core and cause damage to it?

A Yes, that given the right circumstances, a half hour or 40 minutes could have been enough time for a core to have boiled to an extent where a serious degree of core uncovery would occur.

Q Notwithstanding that, you don't know any reason why you recommended only 400 gallons per minute instead of full throttle in the high pressure injection; is that your testimony?

MR. FISKE: I will object to the form of the question, but you can answer it.

A 400 gallons per minute would assure turnaround of the process in that 400 gallons was enough to absorb core decay heat without forming steam so a positive increase in vessel inventory would occur simultaneously with the achieval of 400 gallons per minute.

Other than that, I know of no reason why I wouldn't have recommended full high pressure injection.

Q If the core were partially uncovered by the time your instructions or recommendations were communicated, wouldn't it have helped re-cover the core faster if the charging rate

were higher?

A Yes.

Q Wouldn't that have been better for the plant if the damage to the core had not already been irretrievable?

MR. FISKE: Well, I object to the form of that question.

I think you are now asking Mr. Dunn to express an opinion on something that involves a lot of other variables. The first part of the question I don't have any problem with, but the last part of it I think is objectionable.

MR. SELTZER: O.K.

Q Based on just the knowledge that you had or the belief that you had that possibly the core was uncovered to some partial extent, wouldn't it have been better to have a higher charging rate to re-cover the core?

A Re-covery of the core would proceed faster if the charging rate were higher. We felt that charging rate was adequate.

Q What people from the morning meeting were also at the afternoon meeting at Lynchburg

on March 28th, 1979.

By the morning meeting, I mean the meeting you attended at about 11 o'clock, and the afternoon meeting I am referring to is the war room meeting.

A At least Allen Womack.

Q Anyone else?

A An answer as to somecne else would have to be an expectation on my part.

Q Whom else do you have an expectation with respect to?

MR. FISKE: I don't think this is particularly useful.

MR. SELTZER: Well, it is reasonable calculated to lead to the discovery of admissible evidence. We will ask these other people whether they were actually there.

A I believe Bruce Karrasch was in the afternoon meeting, and I cannot recall positively whether or not he was in the 11 o'clock meeting.

Q The 11 o'clock meeting was a meeting for unit managers in the Design Section; right?

A Yes.

Q And Bruce was a unit manager in the Design Section at that time?

A Yes.

Q Is there anybody else whom you believe or expect was at both meetings?

A Not that I recall.

Q Did Bob Jones come into the afternoon meeting at all?

A I don't recall whether he came in or not.

Q Did you have a copy of Bob's notes with you when you attended the afternoon meeting?

A I don't believe so.

Q Do you think Allen Womack had a copy, to the best of your recollection, of Bob Jones's notes from the morning meeting?

A I have no idea.

Q Did anyone say anything at the afternoon meeting which indicated that they were having difficulty understanding how there could be core uncovery with a full pressurizer?

A I testified earlier I didn't recall the nature of the questions being asked or the one question that I do remember, I do recall making explanations in that arena.

Q I take it it was your feeling at the time that there were people in the room who were in need of explanation in that area; is that right?

MR. FISKE: Well, I am going to object to that unless you clarify what you mean. I mean obviously --

MR. SELTZER: Go ahead.

MR. FISKE: He obviously made an explanation.

MR. SELTZER: Right. Now I am just taking what I think is a --

A Well, for whatever reason, I don't think I like the way you phrased the question, in that it sounded slightly derogatory to me.

Q To you, no. I apologize if I sounded that way at all.

A Derogatory to the others in the meeting.

I did give the explanation.

Q Why did you give the explanation?

A Other than saying that I don't recall the particular questions that were asked to any extent further than I have already testified, the explanations were given. I have no reason to

doubt earlier testimony on the issue and the answer as to why would be speculation.

Q Let me ask you, since you previously testified that you had difficulty convincing other people in the room that the plant was in trouble, was the explanation that you were giving about the consistency between an uncovered core and a full pressurizer part of what you were doing to convince the others in the room that the plant was in trouble?

MR. FISKE: I think he said "could be in trouble," is the way he mentioned that yesterday.

MR. SELTZER: Fine.

A It was part of the effort I was making to get us to recommend increased charging by the HPI system, the particular number in question being 400 gpm.

Q I take it you were trying to convince people that 400 gpm charging should be recommended because you believed the plant could be in trouble without that high pressure injection; isn't that right?

A Yes. I used the term "loosing." By that

I meant that although it was my perception at the time I heard the super heat information that the core was covered, it did not appear that short of some increase in the charging rate that it would necessarily stay that way.

Q Since March 28, 1979, have you sat down with others from B&W and reviewed what was happening at Lynchburg on March 28, 1979?

A Yes.

Q Have you done that more than once?

A Yes.

Q When was the first time that you did it?

A Sometime within a few days of the accident.

Q When was the next time you did it?

A I am not sure of the time of it, the timing of it.

Q About when?

A The next recollection of such a discussion could be any time within a couple of months.

Q When was the next time that you had such a discussion?

A That I recall, it was in preparation for the Kemeny Commission.

Q When is the next time?

A That I recall, it is the Kemeny Commission deposition itself.

Q When thereafter?

A Preparation for the Rogovin deposition.

Q Why don't you continue and tell me each subsequent discussion.

A The Rogovin deposition, and I believe in discussions with Rudy Straub concerning the nature of what type of response mechanism for an accident like this should be created within B&W.

Q And you wrote Rudy a memo on that?

A I did write a memo on that. I don't believe the memo discusses the events of the day, though.

MR. FISKE: On the assumption that you are now going to go through these discussions one at a time, this might be a convenient time to take a break. I have to make a couple of calls.

MR. SELTZER: Sure.

(Whereupon, a recess was taken.)

BY MR. SELTZER:

Q You said that you had participated in a post mortem of activities in Lynchburg on March 28, 1979; the first retrospective analysis was within a few days of the accident.

With whom were you discussing events on that occasion?

A Byron Nelson.

Q Is he the famous golfer?

A No.

Q A different Byron Nelson?

A Yes.

Q Was anybody else present?

A No.

Q Why were you talking about it with Mr. Nelson?

A It was my understanding he was trying to create some kind of record of what occurred that day.

Q Did you write anything down for Byron Nelson?

A During the meeting, no.

Q Subsequently, did you?

A I am not sure.

Q Do you believe you did?

A No, I don't believe I did.

Q Who is Byron Nelson?

A At this time he was head counsel for the legal activities in contracts at the B&W office in Lynchburg.

Q Was the conversation that you and he had within a few days of the accident one in which he was acting in his legal capacity?

A I don't know.

Q What did you say to him, in words or substance?

MR. FISKE: Well, I will object to this conversation. I think this is clearly a privileged communication.

Q Were you seeking any legal advice from Nelson?

A No.

Q You said that within a couple of months of the accident, you had another discussion of the events at Lynchburg on the day of the accident.

With whom was that discussion?

A I believe the discussion was with Allen.

Q Was anybody else present?

A I don't know.

Q Where was that conversation?

A I am not sure. It was at the old Forrest Road building.

Q About how long did you and Allen Womack discuss the events of March 28, 1979?

A I don't believe I can recall.

Q As best you can recall, in words or substance, what did you and Allen Womack say to each other?

A I don't remember Allen's communication to me during the meeting.

What I remember about it is that I was communicating to him my feeling that if we were going to have responses to accidents, where we were going to serve that function, we ought to rethink how we could do that, because I was feeling that our capability of generating the recommendation of 400 gpm had taken too long in terms of the possible time frame of an accident.

Q Did you suggest to Allen Womack what B&W could have done to come up with recommendations faster on the day of the accident?

MR. FISKE: Could I hear that question, please.

(The reporter read the question.)

A No.

Q What, as best you can recall, did you say to Allen Womack about it having taken too long to come up with a 400 gallon per minute recommendation?

A Well, that or my opinion in that area, and I was couching the discussion with a future orientation.

Q Is there anything else you can recall discussing with him on that very specific subject?

A No, no particulars.

MR. SELTZER: I would like to mark for identification as GPU Exhibit 98 a memorandum from Bert M. Dunn to Rudy Straub, subject: Emergency Response Procedures Comments, April 23, 1980.

(Memorandum dated April 23, 1980, to Rudy Straub from B. M. Dunn, was marked GPU Exhibit 98 for identification, as of this date.)

Q Is GPU Exhibit 98 a copy of a

memorandum which you sent to Mr. Straub on or about April 23, 1980?

A Yes.

Q Since April 23, 1980 has B&W developed procedures and put procedures in place for responding to emergencies?

A Since April 23rd, 1980?

Q Right.

A Some procedures are in place.

Q Are they procedures that were formalized after April 23rd, 1980, to the best of your knowledge?

A The ones I recall were formalized to the most extent before April 23rd.

Q Your first recommendation in GPU Exhibit 98 was that the emergency response team should consist -- in the first line -- of people who are at lower levels within the B&W Company; right?

I am sorry, I have confused two different levels in that question.

Your recommendation was that the first people who would be contacted by a site during an emergency and who would be making

recommendations to a site during an emergency should be lower level people; is that right?

A I identify two phases for the response to an accident, an early response, and suggest that that team who would be active at that time be made up of people who have an immediate and intimate knowledge of the system, capable of extrapolating to emergency conditions, and suggest further that those are people who are probably at a lower level in the organization than those indicated in the response organization that I was reviewing at the time.

Q I take it, for emergency response there were people from what was the Plant Design Section that would be called upon under the plan that was proposed in the April 18th memo and in the proposal that you are making; is that right?

A Yes.

Q What is the level of people from the Plant Design Section that you felt it would be appropriate to be involved in the first phase of an emergency response procedure?

A The level should really be explained in

terms of a sentence in the middle of the paragraph in which I say that during this phase, the early phase, I believe the response team should be organized out of individuals who have the primary knowledge immediately available within their craniums, within their heads, and I would, in general, not expect that to be a level above unit managers and, in some circumstances, not unit managers.

Q Your second numbered paragraph refers to people who would be receiving plant data during the emergency; is that right?

A Yes.

Q Here again you thought that the people that should be receiving the information directly should be the lower level people who would be performing the calculations and working immediately with the data; is that right?

A I did not mean it to exclude the upper level people, but rather that the data should be available directly to the people performing whatever calculations might be required.

Q In the third paragraph which appears on the second page of GPU Exhibit 98 marked for

identification, you refer to the present emergency response organization.

Do you see that phrase?

A Yes.

Q You say: "I believe, were we to construct as an example, a problem with a plant which would require strong diagnostic efforts and issue this as a work order to the present Emergency Response organization we would find that organization ill equipped to provide assistance in a critical time frame. This organization would appear to work best from day two of the incident through closure as it did during TMI. This organization was in place during the morning of TMI and it worked extremely ineffectively for many reasons."

When you say "this organization was in place during the morning of TMI," what organization are you referring to?

A This would be secondhand information, but at the time that I wrote this memo I was under the impression that a team of people had been collected in the morning at B&W to deal with the accident in some fashion at Three Mile Island.

I was not a member of the team and I really do not know what they were trying to do or whether they had information upon which to do anything.

Q You said that "this organization was in place during the morning of TMI and it worked extremely ineffectively for many reasons."

In what way did you feel, when you wrote this, that the organization had worked extremely ineffectively for many reasons?

A I do not want to testify to the accuracy of the information, but at the time I wrote this line, I was under the belief that some information about the accident was available to those individuals and I had no information that they had been able to improve the situation at Three Mile Island.

Q What do you mean, improve the situation?

A I mean just that, that I can't tell you what I -- what information they had, whether they knew or not, for example, that the high pressure injection had been terminated or was at that time terminated -- well, at least ramped back. So it was a very general impression

at the time I wrote the memo and could have been inaccurate.

Q You say it worked ineffectively for many reasons.

What reasons were you thinking of when you wrote this memo?

A I don't recall today.

Q As you reread your words today, can you reconstruct any of the many reasons that you believed the organization worked extremely ineffectively?

A No.

Q Did the organization that was in place, as you understood it was in place on the morning of the Three Mile Island accident, include the lower level people who have primary knowledge available within their heads?

A I don't know who was involved in that team, so I can't answer your question.

Q Have you ever heard of any of the lower level people that you would consider appropriate people to be involved in the first phase purportedly having been involved in the emergency response organization that was in

place during the morning of the Three Mile Island accident?

A No, not one way or the other.

Q Do you know the name of anyone who was part of the organization that was in place during the morning of the Three Mile Island accident?

A No.

Q Do you have any belief as to who any of the people were who were involved in that organization?

A I believe that at one time I was told that Bruce Karrasch was involved in it.

Q Anyone else?

A No.

Q Do you have any expectation as to whom else was involved?

MR. FISKE: I will object.

Q You may answer.

MR. FISKE: I will object to the form of the question.

A Yes.

Q Who?

A I would expect Don Hallman to have been

involved.

Q Anyone else?

A No, I don't hold other expectations.

Q From what do you have the belief or expectation that Hallman and Karrasch were involved in the response team on the morning of March 18, 1979?

A For Mr. Hallman, because of his position and because I believe he was involved intimately in the afternoon sessions and following the accident, throughout the day, and from the response we gave to Crystal River, which I recall Don Hallman being in charge of the communications to the plant. And Mr. Karrasch, because of the statement I believe I was told, that he was there.

Q Do you have any belief or expectation as to anybody else being involved in the morning response organization?

A No. I have a belief that there were more people involved, but no expectation or belief about who they were.

Q After you sent your memo, GPU Exhibit 98 marked for identification, did anybody who

received it ever discuss any aspect of it with you?

A I discussed aspects of it with Rudy Straub after that.

Q Did you discuss it with anyone else?

A Not that I recall at this time.

Q What was Rudy Straub's reaction to your memo, as he expressed it to you?

A The discussion that I had with Mr. Straub centered around the possibility of utilizing the computing facilities in Lynchburg for data display. Mr. Straub was doubtful that a system as I envisioned it could be put in place without a great deal of investment, and I was trying to convince him to remove that doubt and to explore the possibilities, in that I did not feel such a system would cost a tremendous amount of money or effort to put in place.

Q Did you discuss with Rudy Straub how the B&W organization had responded on the day of the Three Mile Island accident?

A I do not recall.

Q Did anybody ever get back to you in words after April 23, 1980 and tell you that

you were all wrong in saying that the organization at B&W had worked extremely ineffectively on the morning of the Three Mile Island accident?

A No.

Q Did anybody get back to you and say that you were in any way wrong in saying that the organization that was in place during the morning of the Three Mile Island accident had worked extremely ineffectively?

A No.

Q Did Don Hallman, whom you copied on this memo, ever say anything to you about your accusing the organization of having worked extremely ineffectively?

A Not that I recall.

Q Did Allen Womack ever get back to you and say that you were off base in accusing the B&W organization of having worked extremely ineffectively on the day of the accident?

A Not that I recall.

MR. SELTZER: I would like to mark for identification as GPU Exhibit 99 Bert Dunn's memo to Jim Taylor, subject: .04 Square Foot Pump Discharge Break Analysis,

dated April 14, 1978.

(Memo dated April 14, 1978, to J. Taylor from Bert M. Dunn, was marked GPU Exhibit 99 for identification, as of this date.)

Q Is GPU Exhibit 99 a copy of a memo you sent to Jim Taylor on or about April 14, 1978?

A Yes.

Q This refers to the same problem of compliance with 50.46 for small breaks in the pump discharge line that we were discussing yesterday; right?

A Yes.

Q Did someone in your unit prepare the table that is attached to GPU Exhibit 99 marked for identification?

A Yes.

Q Was the table prepared at your request?

A I don't know.

Q TMI-1 and TMI-2 are listed as plants in the left-hand column of the table.

Do you see that?

A Yes.

Q What is the heading over the third column? Could you read it, please.

A "Is current HPI acceptable."

Q What does that heading mean?

A For operation at the power levels indicated in the second column as the current HPI system flow rate acceptance point, 10 CFR 50.46, to mitigate the accident.

Q And keep the core effectively cooled?

A To the requirements of 10 CFR 50.46, yes.

Q And the answer for all of the type 177 plants that were then in operation were lowered loops negative; right.

A Yes, although that answer would appear to be wrong for Crystal River 3 and Midland 1 and 2.

Q You are saying that just because those plants were not operating above zero power?

A Yes.

Q Do the percentages in the fourth column mean that if Three Mile Island Unit 1 were constrained to operate below 70 percent of full power, its high pressure injection system would be able to operate in conformance with

10 CFR 50.46?

A Yes.

Q And similarly, if Three Mile Island Unit 2 were constrained to operate at less than 64 percent of full power, its high pressure injection system would be able to function in conformance with 10 CFR 50.46; right?

A Yes.

Q And above those power levels for Units 1 and 2, the high pressure injection system would not be able to meet the criteria of 10 CFR 50.46 for effective mitigation of an accident and effective core cooling; right?

A Yes.

Q What do the percentages in the sixth column signify?

A Acceptable power levels envisioned at that time for the plants if the high pressure injection system was cross-connected so that four points of penetration for the ECCS would be achieved in the event a single pump was operating.

Q Could that cross-connection be either manual or automatic?

A I don't believe we refined the position one

way or the other on manual versus automatic at the time we issued this memo.

Q What I meant was -- and maybe I didn't phrase it as clearly as I was trying to. The cross-coupling that you are referring to there is a cross-coupling that for purposes of these percentages could be achieved either through manual cross-coupling or through some other automatic cross-coupling; is that right?

A Yes, that is correct. But I am not sure we have truly explored at the time we wrote the memo the time constants associated with the manual cross-coupling, and if they were long-time constants, they would not be acceptable.

Q What does that mean? What do you mean, if they were long-time constants?

A Well, to stretch the point to illustrate it, if it took an hour to achieve the cross-coupling of the high pressure injection system, I don't believe that these power levels would be acceptable.

Q So the percentages of full power which make the high pressure injection acceptable depend on the speed with which the cross-coupling

could be achieved?

A Yes.

Q Even if the cross-coupling is achieved immediately, does column 6 mean that at Three Mile Island Unit 2 the high pressure injection would still not be able to comply with 10 CFR 50.46 for operation above 93 percent of full power?

A No.

Q What does that mean?

A It means that at the time that we wrote this memo, we could not justify operation above -- we could not, in our opinion, justify operation above 93 percent power for that plant.

Q Did you since do any analysis in your unit that justified higher power levels?

A Yes.

Q What power level did you justify?

A 100 percent.

Q Who did that work?

A ECCS.

Q Is there somebody in your section or unit who is particularly familiar with those analyses?

A Well, I am familiar with the analyses to an extent, Bob Jones is familiar with them.

Q What is the difference between the analysis that produced the 93 percent figure and the analysis that you say has since produced a 100 percent figure?

A The analysis that produces the 93 percent figure is an extrapolation based on previous experience and our evaluation at that time of the .04 square foot break.

The analysis which justified 100 percent operation for TMI-2 utilized improvements in the basic evaluation model and was a full computerized simulation of a spectrum of small break area accidents.

MR. SELTZER: I would like to mark for identification as GPU Exhibit 100 a handwritten memo from Mr. Dunn to Cliff Russell, subject: ECCS Small Break Analysis, May 9, 1978.

(Handwritten memo from Mr. Dunn to Cliff Russell, dated 5/9/78, was marked GPU Exhibit 100 for identification, as of this date.)

Q Is GPU Exhibit 100 a copy of a memo that you sent to Cliff Russel on or about May 9, 1978?

A I don't know.

Q Is that your "Bert M. Dunn" on the second line?

A Yes.

Q Does it appear that the preposition "from" and a colon is immediately to the left of your name?

A Yes.

MR. SELTZER: Would this be a good time to have lunch?

MR. FISKE: My impression is that it would be.

MR. SELTZER: All right.

(Whereupon, at 1:30 p.m. a lunch recess was taken.)

AFTERNOON SESSION

1:55 p.m.

B E R T  M E R R I T  D U N N, resumed.

MR. SELTZER: We have resoled off the record the dispute we had this morning over whether I can ask Mr. Dunn about his evaluation of the performance of Bob Jones. Mr. Fiske has advised me that he will withdraw any objection to my pressing that question. Is that right, Mr. Fiske?

MR. FISKE: Yes, that is correct, as long as it is understood our allowing Mr. Dunn to answer this question in this deposition is without prejudice to any position we may or may not want to take with respect to a similar inquiry later.

EXAMINATION (continued)

BY MR. SELTZER:

Q What is Bob Jones's principal area of expertise?

A Loss-of-coolant accident evaluations.

Q Have you reviewed and evaluated Bob Jones's work in doing loss-of-coolant accident evaluations?

A Yes.

Q How have you rated his ability in that area?

A I have rated Bob with the highest possible rating within the B&W system.

Q Does that mean that you have given him a 10?

A B&W uses a scale of 1 to 6. I have given him a 6.

Q Have you consistently rated him as high as the scale goes, to the best of your recollection?

A Certainly I have done that since he -- I became Unit Manager.

Q Does Bob Jones comprehend things quickly?

A In my opinion.

Q In your opinion, what?

A He comprehends things quickly.

Q Does he think clearly?

MR. FISKE: You know, Mr. Seltzer --

Q From what you have observed?

MR. FISKE: Mr. Seltzer, I am not sure that I understand this particular

line of questions. I assume you are not talking now about some rating that Mr. Dunn has given Mr. Jones, you are asking him a lot of general questions about Mr. Jones, which I am not sure really can be answered in the abstract.

MR. SELTZER: I am talking in terms of the evaluations that Mr. Dunn has done of him, the formal evaluations, and the consideration that has gone into those formal evaluations.

What is the pending question?

MR. FISKE: I guess maybe you haven't asked Mr. Dunn whether the questions you are asking him are part of his formal evaluation process. I would like to know whether the questions you are asking him now are encompassed within the review that led to this rating, or whether you are justing going off on some line of questioning which is outside or different from that.

MR. SELTZER: Well, I think you are being constructive.

Q What does it take to get a perfect 6?

What qualities are embraced by the award of a perfect 6?

A I don't know that I have ever faced the issue of what it takes to get a perfect 6.

Q Are you an easy marker? Does everybody get a 6 from you?

A No. I am not an easy marker.

Q So that it is an indication of significant approval and high estimation that you have given a 6 to Bob Jones?

A That is correct.

Q What are the qualities which distinguish Jones, who gets a 6, from people whom you have rated lower than a 6?

A Extras in the performance of his duties, things that are clearly above and beyond the call of normal expectation.

Q What has he done beyond normal expectations?

A To answer the question completely, I would want to review the documentation I provided on his rating.

One representative possibility, which is applicable to Bob, is that he is able to serve

very well as my replacement when I am involved in travel or vacation.

Q When you return from travel or vacations, do you sometimes sit down with Bob Jones and review the work that he has done in your absence?

A We would generally review the work that he did in my absence, which was in the fashion of work that I would normally do, with particular attention to items which remained open and would require further action on my part.

Q Did I understand your prior answer to be that you felt he has handled situations in your absence with a high degree of competence, a very high degree of competence?

A Yes.

Q Did you think that he was able to comprehend new situations that arose in your absence well?

A Yes.

Q In GUP Exhibit 98 you recommended that lower level people who had primary knowledge immediately available within their brain should be the first people to be on call at B&W when

there was an emergency at a B&W plant.

Do you recall that?

A Yes.

Q Is Bob Jones the kind of person that you would recommend within that context be available at B&W?

A Well, I don't think we have a proper formulation for making a recommendation of any individual in front of us, but in a very general response, I believe Bob Jones would be the type of person or a person which we might well recommend.

Q What do you mean, we don't have a proper formulation?

A We have a general idea of the kind of people that ought to be there. We haven't decided whether we are going to make these lower level people an express team which might be extensively trained, we haven't decided whether we are going to try and pull them out of the existing organization. The idea is not formulated yet in that memo.

Q As of the date of the Three Mile Island accident, did you believe that Bob Jones

was the kind of person who was well qualified because of the primary knowledge immediately available in his head to participate in a B&W emergency response team?

A Yes.

Q In the licensing analysis, if that is a phrase that makes sense, that was done during the years up through 1977, it is a fact, isn't it, that one of the assumptions that was made was that there was a loss of offsite power when a transient occurred?

A No.

Q For what types of loss-of-coolant accidents did you assume, as part of the design basis, that there was a loss of offsite power?

A For those accidents in which a loss of offsite power would be a more severe condition than a continuation of offsite power.

Q For small break loss-of-coolant accidents, was it considered conservative to assume that there was a loss of offsite power?

A Yes.

Q In other words, it was thought that more severe consequences followed from a loss

of offsite power at the same time that there was a small break LOCA?

A Yes.

Q Did there come a point in time in 1978 when ECCS analysis discovered that for some small breaks it was nonconservative to assume loss of offsite power?

A I don't think so.

Q Didn't you do analyses in 1978 that demonstrated that for certain small breaks it was not clear that leaving the reactor coolant pumps running resulted in an enhanced ECCS situation?

MR. FISKE: Just read the question back, please.

(The reporter read the record.)

A Again, I don't think that is what we did.

Q What was the evolution in ECCS knowledge at B&W in 1978 regarding the pumps-running case?

A In regards to recent considerations on pump behavior during small break LOCA, and not pinning myself down to particular dates, we had been asked the question by other people, about the

condition of the reactor coolant pumps and whether or not it was a worse case to assume that they were off or on, and because our decisions in the area were basically subjective, we did do an evaluation of a pumps-running small break loss-of-coolant accident, which verified our position that pumps off would be the appropriate basis upon which to perform licensing calculations.

Several months after that, following the TMI accident, it was discovered that the timing of a loss of offsite power, for example, or any other mode or action which could terminate the function of the reactor coolant pumps would be more conservative if placed some time into the accident.

Q In other words, the worst case for certain small breaks was one in which the reactor coolant pumps continued to operator for some time into an accident and then were shut off; is that correct?

A Given the analytical techniques available at the time and the analytical techniques available today, yes.

what in the phrase "void fraction"?

A "Void fraction" is a term used to express the volumetric ratio of steam content versus liquid water content, the fraction is expressed as the percentage or literal fraction of steam in a fixed volume over the fixed volume.

Q Is it correct that your ECCS Analysis Unit has studied the ability of a core to remain effectively cooled with a combination of reactor coolant pumps running and high void fractions?

A Yes.

Q When was that analysis or study done?

A I don't recall all of it.

Q You don't recall what?

A All of it.

Q When is the earliest that you recall any portion of it being done?

A The first explicit evaluation that I can recall at this time was an evaluation of a core floodline break performed in 1972 or 1973. Now, it had high flows but did not involve the status of the reactor coolant pumps. It had high flows for -- in the core and high void fraction

cooled acceptably.

Q What is the earliest that you can recall any study being done at B&W of the ability of the reactor coolant pumps to maintain effecitve cooling of the core with high void fractions?

A I think we should draw a differentiation between reaching an assumption or reaching a conclusion in a study, and that a study may indicate specific computer analysis rather than the generation of opinions.

The one I recall today that would be in the form of a study on the subject is the work in -- I believe, in later '78.

Q Who did that study?

A I believe it was Mr. Nehru Shah.

Q Is he in your unit?

A Yes. Well, he was at that time.

Q Were there analyses that had been done earlier that evaluated this phenomenon or question? In other words, were there analyses that had been done before the Nehru Shah study that resulted in the generation of some information on the ability of the core to remain

effectively cooled with high void fraction and pumps running, even if that wasn't the purpose or focus of the study?

A Well, I mentioned the earlier evaluation on the core floodline break.

Q Yes, but you said the pumps weren't running.

A No, but it indicated high flows and high void fraction would create acceptable core cooling, and then, or in addition, experimental information on the performance of pumps in voided situations, which indicate that the pumps will generate such flows.

Q Who did that work on pumps?

A The first work in the area was derived from a textbook on pump performance. The second piece of work in the area was the work by, I believe it was Idaho Nuclear at that time -- I could be wrong on that -- in which the semi-scale facility pumps were tested in flow regimes varying from solid water to st[illegible]

Later, B[illegible]rmed similar experiments at the B[illegible] Pump Company in Portland, Oregon, and Combustion Engineering has

since performed similar experiments under an EPRI contract.

Q When did B&W perform the Bingham Pump tests?

A I don't recall.

Q Before the Three Mile Island accident?

A Yes.

Q Years before it?

A That would be my expectation.

Q Have you seen a report of the Bingham Pump tests?

A Yes.

Q Did they show the ability of reactor coolant pumps to keep on pumping with high void fractions?

A Yes.

Q How would you go about finding that report if you were back at Old Forrest Road?

A I would ask Joe Cudling.

Q What unit is Joe in?

A Joe is the Unit Manager of Systems Analysis Technology.

Q Systems Analysis Technology?

A Yes.

Q Do you have a copy of the textbook that discusses the ability of pumps to keep running with high void fractions?

A I don't think so.

Q From the reports and analyses done, what is the highest void fraction at which reactor coolant pumps can keep on pumping and the core continue to be effectively cooled?

A 100 percent.

Q How long can a Babcock & Wilcox 177-FA plant's reactor coolant pumps continue pumping without failure with void fractions in the neighborhood of 95 to 98 percent?

MR. FISKE: You mean how long will the pumps keep working?

MR. SELTZER: Right.

A I don't believe the answer would be unique. The pumps are not manufactured by B&W; they are purchased from at least three vendors, I believe.

I have been told that they will continue to function for an extended period of time. The actual answer should be obtained from

our pump experts.

Q When you say "an extended period of time," what is an order of magnitude that you are thinking of as you say that?

MR. FISKE: You mean that he has been told?

MR. SELTZER: I just am trying to understand his last answer.

A Provided that certain coolant water is provided to the pump -- I believe the term is component cooling water -- and it is unclear on the need for seal injection in my mind at this time, we are talking about times expressed in days, to my understanding.

Q Is the seal injection injection of oil to lubricate the seal?

A It is my understanding it is water.

Q What is the source of the water for component cooling of the reactor coolant pumps?

A I do not know.

Q Is it a reservoir that is distinct from the primary coolant system?

A It is not the reactor coolant system.

Q That is what I meant.

A In the form of a vessel, the various major pipes, steam generators, et cetera.

Q So it is not either the primary loop or the secondary loop that is supplying water to cool the reactor coolant pump, right, to the best of your knowledge?

A I don't believe it is the secondary loop either, but it is not the primary loop.

Q So there is some independent system that supplies cooling water to keep the reactor coolant pumps cool and functioning; is that your understanding?

A That is my understanding.

Q And is it also your understanding that there is a source of water that cools the seals on the reactor coolant pumps that is independent of the primary coolant system and the secondary system?

A Independent of the primary system.

Q You don't know whether it is independent of the secondary system?

A No, I don't.

Q When did you first learn that the reactor coolant pumps could run for days with

void fractions in excess of 95 percent?

A I don't recall.

Q Is it something that you came to know before the Three Mile Island accident?

MR. FISKE: I will just object to the form of the question.

A I had that conclusion before the Three Mile Island accident.

Q Is that a conclusion that you had years before the Three Mile Island accident?

A I believe so.

Q Prior to the Three Mile Island accident, did you have any participation in the development of draft procedures for the operation of B&W nuclear plants?

A No.

Q Did you or your unit review any of the procedures being drafted by B&W prior to the Three Mile Island accident?

A Not that I recall.

Q To your knowledge, was there any transfer of the work and knowledge of your unit into the procedures being drafted by B&W for the operation of its nuclear plants?

A I don't know one way or the other, without speculation.

Q As you sit here, you don't have any knowledge of such transfer of information; is that right?

A Prior to the Three Mile Island?

Q Right.

A Yes, I do not know or have any knowledge of such transfer, as to whether it occurred or not.

Q Have you ever discussed with anyone whether it would have been advantageous for B&W to have had more input from ECCS Analysis in drafting procedures prior to the Three Mile Island accident?

MR. FISKE: Can I hear that question again, please.

(The reporter read the question.)

A I don't recall having such discussions.

Q Have you ever written to anybody or received anything in writing from anyone else which stated in words or substance that more input from ECCS Analysis into the drafting of procedures would have been advisable or beneficial

prior to the Three Mile Island accident?

A No, I don't think I can say yes to that.

Q Do you think you could say no to it?

A As you expressed the question, I think I could say no to it.

Q Other than the occasional lectures which you or others from your group sometimes gave in the training program prior to the Three Mile Island accident, did your unit have any other input into training or procedures for B&W nuclear plants that you know of?

A Now, you would have to ask the people who wrote those draft procedures where they obtained their input, other than my efforts on HPI management out of Davis-Besse of course.

Q But prior to the Three Mile Island accident, those efforts never found their way into any procedures or training, did they?

A To my knowledge, no.

Q You would have wanted them to have found their way into procedures and training, wouldn't you?

A Well, I wanted to assure myself on the methods for controlling HPI, and if that meant

they should find their way into procedures, yes.

Q Your unit, prior to the Three Mile Island accident, had been doing analysis on the performance of emergency core cooling systems; right?

A Yes.

Q Was your unit the principal place within Babcock & Wilcox where analysis of the performance of emergency core cooling systems was being done?

A I would think so.

Q Your unit had within it more knowledge about how to cool a core following a loss-of-coolant accident than any other unit within B&W; isn't that right?

A I don't know.

Q Do you know of any other area within B&W where there was greater knowledge about how to cool a core following a loss-of-coolant accident?

A No.

Q Prior to the Three Mile Island accident, no one came to you and said, in words or substance, "Mr. Dunn, we would like you and

your unit to review whether the procedures that we have for cooling the core following a loss-of-coolant accident are appropriate procedures"; is that right?

A To the best of my recollection, yes.

Q It is also a fact, is it not, that prior to the Three Mile Island accident no one came to you and said, in words or substance, "Mr. Dunn, we would like you or your unit to review the training which we are giving operators to see if we are giving them proper training on emergency cooling of the core following a loss-of-coolant accident"; is that correct?

A As I recall it today, that is correct.

MR. SELTZER: Can we take a short recess.

MR. FISKE: Sure.

(Whereupon, a recess was taken.)

BY MR. SELTZER:

Q You are familiar, are you not, with WASH-1400, Professor Rasmussen's reactor safety study, are you not?

A I know of it.

Q Had you heard of it before the Three

Mile Island accident?

A Yes.

Q Had your unit ever made any use of it prior to the Three Mile Island accident?

A Not to my knowledge.

Q Had you participated in any discussions prior to the Three Mile Island accident in which the WASH-1400 was part of the conversation?

A I don't recall any at B&W.

Q Where had you participated in any such discussion?

A I went to a local American Nuclear Society meeting in which the presentation concerned the probability of a nuclear accident, and a lot of the source information that the presentator used, he made reference to WASH-1400.

Q When was that ANS meeting?

A I don't really recall. I believe it was before Three Mile Island.

Q Has it ever been pointed out to you in conversation or in writing the extent to which the WASH-1400 report predicted the Three Mile Island accident?

A No.

Q Are you aware that the WASH-1400 report discusses the probability of a pilot operated relief valve failing open?

A No.

Q Are you aware that the WASH-1400 report discussed the probability of all auxilliary feedwater being valved out?

A No.

Q Is this the first time you have heard that either of those subjects is discussed in WASH-1400?

A I don't know.

Q Do you know what an event tree is?

A Generally.

Q Since the Three Mile Island accident, has your unit used event tree logic in analyzing loss-of-coolant accidents?

A No.

Q Have you used fault tree analysis since the Three Mile Island accident?

MR. FISKE: F-a-u-l-t, fault tree?

MR. SELTZER: Right.

A I don't believe so.

Q Are you telling me your unit does not

study the alternative courses which a transient can take?

A No. I am telling you that I think you asked for whether we applied specific techniques which we could call one of those. We have evaluated alternate courses for loss-of-coolant accidents. If we unconsciously used one of those techniques, that is fine.

Q Maybe we are hung up on a semantic distinction that is getting in our way.

What do you understand fault tree or event tree analysis to be?

A Well, I don't think I know what fault tree analysis is, although I expect it might be like failure mode and effects analysis.

I don't -- in addition, I don't think I know what event tree analysis is. I think I know what an event tree is, which is a graphical representation of the evolution of a certain set of circumstances, with blocks on it indicating where decisions or actions may take one of two or three possible courses.

Q I didn't mean to be unduly mechanistic in referring to event tree logic.

As we have now discussed it, does your unit perform analyses which are akin to event tree analyses?

A In the fashion that we create operator guidelines for the management of small break loss-of-coolant accidents, the guidelines are constructed to provide suggestions for operator response to system indications with the availability or nonavailability of various systems and/or components, that word might be close.

Q Were you doing that kind of analysis before the accident also?

A No.

Q What has induced you to do it since the accident?

A First there was the NRC request for small break operator guidelines for safe management of the accident after its initial phase, and following that, the recognition of the value of programs like ATOG in which it is considered to be of benefit to have guidance to the operator which considers the availability of various pieces of equipment and systems.

Q Who considers it a benefit? Whom were you referring to when you said it is considered a benefit?

A I think B&W as a whole considers it a benefit, I think our customers consider it a benefit because they are paying us to do it, and I believe the NRC considers it a benefit.

Q In ECCS analyses done prior to the Three Mile Island accident, what, if any, assumptions were made about whether the pilot operated relief valve had functioned or not?

A The analysis performed before Three Mile Island would generally be pressurization analyses in which it was assumed that the valve would function to the extent that it would stay closed.

Q Did you do any analysis that assumed that the valve had cycled prior to or at the start of the transient? When I say prior to, I mean immediately prior to.

A I don't believe so.

Q Did you do any analyses of the response of the system to a loss of feedwater?

A Not within the licensing basis.

Q What about outside the licensing basis?

A There was analysis on a mode of cooling which has been affectionately termed "burp and slurp," in which you postulate a total loss of feedwater and ask yourself if you can still cool the core.

Q And does the burp and slurp method of cooling involve intentional opening of the pilot operated relief valve to release energy?

A It does not depend on that.

Q How is the system burped?

A The system can be acceptably burped through the code safeties.

Q Was there any accident sequence that your unit studied in which the probability of failure of the pilot operated relief valve was taken into account prior to the Three Mile Island accident?

A As I mentioned previously, that accident or such accidents in general were considered to be bounded by the licensing spectrum.

Q Would you take a look, please, at GPU Exhibit 75 which we marked at the start of your deposition. Would you turn to the second

page of GPU Exhibit 75, please.

In the section headed "Areas of Expertise Within Unit," "Unit" refers to the ECCS Analysis Unit; right?

A Yes.

Q What does item 6 mean, "Development of ECCS system performance criteria"?

A Specification of the flow rates required at the reactor coolant system pressure boundary for the HPI system and the LPI system, specification of the pressure inventory requirements for the core flood tanks, specification of a minimum flow for assured recirculation within the RCS following large break loss-of-coolant accidents to prevent boron concentration to an unacceptable level.

Q Would you turn to the next page under heading 5 where it says "Summary of Recent Experience." Item 4 says "Analysis of stuck open pilot operated relief valve following a small break (177 low loop generic)."

A Yes.

Q What work had your unit done to analyse a stuck open pilot operated relief valve?

A Following Three Mile Island, we studied several sequences in which part of the event was a stuck upen PORV.

Q Who did that work?

A Almost everybody in the unit. I would say Bob Jones, Bill Bloomfield, Maria Gharahkani, Nehru Shah.

Q Were reports generated as a result of that analysis?

A Yes.

Q Did you learn anything about the performance of the system that you hadn't known or concluded prior to the Three Mile Island accident?

MR. FISKE: That is a pretty broad question.

MR. SELTZER: Yes.

MR. FISKE: Do you want to narrow it a little?

Can you answer it that way?

THE WITNESS: Yes.

MR. FISKE: O.K.

A I have gone on record previously by saying that short of very fine-line information, these

evaluations confirmed our earlier opinions relative to the bouding nature of our previous work.

Q Did you learn anything new about the behavior of water in the pressurizer following a stuck open pilot operated relief valve?

A No.

Q Item 7 refers to LOFT and semi-scale experimental verification.

What is LOFT an acronym for?

A Loss of fluid test, I believe.

Q Does that refer to the Idaho testing also?

A I would take this as referring to the test performed at the LOFT facility.

Q And the LOFT facility is in Idaho?

A Yes.

Q What recent experience has there been with experimental verification on the LOFT or semi-scale facility?

A At sometime following Three Mile Island a small break experiment was performed at the semi-scale facility and a blind test prediction was required of the reactor vendors.

LOFT has performed, I believe, four small break experiments since Three Mile Island, two of which have been utilized or will be utilized for a code verification. L31 is the designation of the first such LOFT experiment utilized. The verification as part of L36 is ongoing at this time.

And relative to the word "verification," I believe that is a complete story.

You did ask the question post the TMI, didn't you?

Q Well, I said "recent" since that is the heading.

Item 8 is intriguing. That is called "TMI-2 Accident Analysis."

Do you see that?

A Yes.

Q What did your unit do under that heading?

A We have performed a simulation of the TMI-2 accident utilizing the evaluation model employed by B&W previous to the accident, adjusting that model only as necessary for removal of licensing conservatisms which one

cannot use to create an experimental verification or coincidence.

Q Yes.

A And achieved results which are highly credible in view of the accuracy of the information known about the accident.

Q The heading at the bottom of the page is "resource Available."

Under that is written that "The load board is full for the next six months."

Do you see that?

A Yes.

Q Is the load board a reference to a real list of projects that is maintained somewhere in the unit?

A The load board is a list of committed projects, including the manpower requirements, proposed projects -- and forecast is the term used -- projections, which are viewed as likely but have not yet been proposed to anybody.

Q Was it a real board?

A No.

Q Was it a real list?

A Yes.

Q Where is it kept?

A It is maintained by one of my employees.

Q Who?

A Mike Eberl.

Q Does it show who was assigned to each project or prospective project?

A Recently it has been upgraded to do that.

Q Have you ever met with a gentleman known as Carlyle Michelson?

A I have been involved in meetings in which he was active and present. I believe I met him afterwards at one of those meetings.

Q Have you ever discussed with him any concern he had over the extent of ECCS analysis performed by B&W?

A Verbally?

Q You mean orally?

A Have I ever done it verbally or orally; that is your question?

Q Yes.

A I don't believe so.

Q Have you communicated with him in writing?

A The unit has communicated with TVA in

writing and the communication was on concerns raised by Carlyle Michelson.

Q Have you had any truck with Carl since he joined the NRC?

MR. FISKE: Any what?

MR. SELTZER: Any truck.

A I don't believe so.

Q Have you had any communications with Zoltan Rosztoczy?

A Yes.

Q Have you met with him?

A Yes.

Q When is the last time you met with Rosztoczy?

A I believe the last time I met with Zoltan Rosztoczy was during the review of reports prepared by B&W following the Three Mile Island accident.

Q Did you ever have any conversations with him off to one side that were not part of a formal meeting?

A At one time.

Q When was that?

A I do not recall when that was.

Q Was it before the Three Mile Island accident?

A I am not sure.

Q What were you talking about then?

A There had been consideration given in the NRC to revising the decay heat curve imposed by Appendix K for utilizing -- for use in evaluating small break loss-of-coolant accidents -- in evaluating loss-of-coolant accidents in general.

There was evidence available that the curve was considerably conservative. I was trying to tell him that I thought it would be wrong to revise that curve for all loss-of-coolant accident conditions unless suitable conservatism was in some fashion added to the small break evaluations because our major conservatism in that arena is the decay heat curve.

Q Would you look in GPU Exhibit 75 at your resume, page 3.

Item E at the top third of the pages says "alteration" -- I am sorry. Item E appears under the heading: The following major accomplishments were made during this period,

and the period appears to be 1975 to 1980; is that correct?

A Yes.

Q Item E says: "Alteration of ECCS evaluation model and the Nuclear Regulatory Commission approval of that model so that the impact of previously unidentified accident did not affect the operation of approximately seven nuclear power plants."

What is the previously unidentified accident?

A This comment is written in reference to our discovery that the pump discharge break in the small break arena was more severe than the pump suction break which formed the previous licensing basis.

Q Item G says: "Developed and obtained the Nuclear Regulatory Commission approval of the valuation techniques for subcooled, decompression hydraulic forces."

That sounds like pretty interesting stuff. Can you tell me what that refers to?

A During the very first phrase, very first millisecond of a large break loss-of-coolant

accident, the immediate area within the RCS adjacent to the break will decompress to the pressure, the saturation pressure associated with the temperature of the fluid in that area. This will cause what has at times been called a shock wave to propagate through the system. The propagation is time dependent and pressure forces will result on components within the RCS because the wave may have arrived at one side of the component and not at the other.

Q What induced you to leave Hanford?

A I was let go.

I would like to expand on that a bit.

Q Please do.

A I was employed at Hanford approximately two years before the requirement for weapons grade plutonium was reduced by the country, and with the reduction in that requirement, several of the reactors which had been operating at Hanford were shut down. This resulted in an overall reduction of force. As I was one of the younger members of the engineering staff, I was affected by that reduction of force.

Q Were you producing fissionable

material for atomic weapons?

A Yes.

Q Where else in addition to B&W did you apply for future employment?

A I don't know. One other place was Physics International in San Diego, I believe.

Q What led you to apply to B&W?

A I had passed my resume to a professional employment agency, they in turn passed it to B&W, and B&W contacted me.

MR. SELTZER: Maybe instead of going into a new area, we will adjourn for today and make it easier for you to get your plane at 5:30.

THE WITNESS: I appreciate it.

MR. SELTZER: We will resume at 9:30 Monday morning.

(Time noted: 4:00 p.m.)

Bert Merrit Dunn

Bert Merrit Dunn

Subscribed and sworn to before me this 29 day of October 1982.

Danita R. Kidd - Notary
Commissioned Notary as Danita D. Robertson
Commission Expires: July 1, 1983

CERTIFICATE

STATE OF NEW YORK )
: ss.:
COUNTY OF NEW YORK )

I, CHARLES SHAPIRO, a Notary Public of the State of New York, do hereby certify that the continued deposition of BERT MERRIT DUNN was taken before me on March 20, 1981 consisting of pages 500 through 602;

I further certify that the witness had been previously sworn and that the within transcript is a true record of said testimony;

That I am not connected by blood or marriage with any of the said parties nor interested directly or indirectly in the matter in controversy, nor am I in the employ of any of the counsel.

IN WITNESS WHEREOF, I have hereunto set my hand this 7TH day of APRIL, 1981

Charles Shapiro

Charles Shapiro, CSR

# I N D E X



## E X H I B I T S



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